



Contributions of Affective Temperament Traits to Professional Choice: Evidence from the Study of Firefighters, Musicians, Athletes, Bank Managers, Nurses and Paramedics

Marcin Jaracz ¹
Katarzyna Bialczyk²
Adam Ochocinski³
Magdalena Szwed¹
Katarzyna Jaracz⁴
Alina Borkowska ¹

¹Department of Clinical Neuropsychology, Nicolaus Copernicus University in Torun, Collegium Medicum in Bydgoszcz, Poland;

²Department of Health Economics, Nicolaus Copernicus University in Torun, Collegium Medicum in Bydgoszcz, Poland;

³Department of Physiotherapy, Nicolaus Copernicus University in Torun, Collegium Medicum in Bydgoszcz, Poland;

⁴Department of Geriatrics, Nicolaus Copernicus University in Torun, Collegium Medicum in Bydgoszcz, Poland

Purpose: The purpose of this study was to expand knowledge about the relationship between temperament and choice of profession by comparing temperaments among representatives of various professional groups.

Subjects and Methods: A total of 759 subjects aged 18–71, representatives of six professional groups: firefighters, musicians, athletes, bank managers, nurses and paramedics, were included in the study. Temperament was assessed using the TEMPS-A autoquestionnaire.

Results: Musicians showed higher levels of depressive and anxious temperaments whereas firefighters were lower on cyclothymic dimension. Athletes, bank managers and paramedics showed higher intensity of hyperthymic temperament compared to firefighters, musicians and nurses. Athletes showed lower of depressive temperament compared to bankers, musicians and nurses. Bankers obtained lower results of irritable temperament compared to musicians, athletes and nurses. Nurses showed a higher intensity of anxious temperament compared to firefighters, athletes and paramedics.

Conclusion: The results obtained support the concept of adaptive and socially useful role of affective temperaments. The studied professional groups show different individual temperamental profiles, which is justified in such aspects of the profession, as the level of stimulation, stress encountered, the necessity of making important decisions, or entering into relationship with the patient.

Keywords: individual differences, TEMPS-A, nurses, firefighters, artists, athletes, bank employees, paramedics

Introduction

Temperament is a set of biologically determined traits, present from early childhood, and of relatively constant character.^{1,2} They persist in the population due to their functional significance - they affect the way the individual regulates his relationship with the environment. According to the “goodness of fit” model, the optimal circumstances for both the development and mental well-being of an individual occur when the temperamental traits of the individual are in line with the needs of the environment.³ Temperamental traits are widely distributed in the population, and their extreme severity is associated with a greater risk of mental disorders and behavioral problems.⁴

According to the affective temperament model by Hagop S. Akiskal, temperament traits belong to the continuum between norm and pathology.⁵ The model

Correspondence: Marcin Jaracz
Department of Clinical Neuropsychology,
Skłodowskiej-Curie 9, Bydgoszcz, 85-146,
Poland
Tel +48 525853703
Fax +48 525853703
Email marcinjaracz@gmail.com

refers to the work of Hippocrates and Galen, who regarded temperament as a biologically determined pattern of emotional response, and postulated the existence of four temperament types: melancholic, sanguine, phlegmatic and choleric. A direct inspiration for the contemporary theory of affective temperaments is the model of four affective temperaments elaborated by Emil Kraepelin in XIX century. According to it, depressive, manic, cyclothymic and irritable temperaments are subclinical forms of affective disorders, including recurrent depressive disorders, and bipolar disorder with alternating episodes of mania and depression.⁶

In its current form, the Akiskal's model assumes the existence of five affective temperaments: depressive, cyclothymic, hypertensive, irritable and anxious. Similarly to Kraepelin, Akiskal considers these temperaments as subclinical forms of mood disorders. Temperamental traits predisposing to affective disorders are thus widespread in the population, and in sub-clinical intensity, they may have adaptive properties.⁵ Consequently, depressive temperament is characterized by pessimism and self-criticism and its high level is associated with a higher risk of depressive disorders. On the other hand, subjects with depressive temperament are more sensitive to suffering, adhere to social rules, and are willing to sacrifice for others. In personal and professional relationships, they strive for harmony and compromise. In women, depressive temperament is associated with family attachment, while in men - with dedication to work.⁷ Subjects with cyclothymic temperament experience frequent fluctuations in mood, self-esteem and activity. High level of cyclothymic temperament is associated with greater risk of bipolar disorder and a higher risk of suicide in its course.^{8,9} On the other hand, cyclothymia is associated with high motivation to enter romantic relationships. Furthermore, a more intense experience of varied emotions by cyclothymic individuals promotes creativity.^{5,10} Hyperthymic subjects are confident, energetic, willing to take risks. A high level of hyperthymic temperament is associated with a more frequent occurrence of manic episodes in the course of bipolar disorder, and a more frequent mood cycling (from depression to mania and vice versa) in its course.⁹ In a sub-clinical form, hyperthymic temperament promotes leadership qualities, expansiveness and stress resistance, which promotes high position in the group and the ability to manage it.¹¹

Irritable temperament is characterized by puissance, a tendency to complain, pessimism and excessive criticism.

Its high severity is associated with a higher risk of suicide attempt in bipolar disorder and of substance abuse.^{12,13} Simultaneously, individuals with irritable temperament have a high ability to demonstrate critical thinking when necessary. Subjects with anxious temperament tend to worry about their own and their loved ones' health, experience free-flowing anxiety with associated somatic symptoms. A socially adaptive feature of anxious temperament is altruistic anxiety – which manifests itself in care for the safety and health of others.¹⁴

One way the functional and socially adaptive significance of temperament manifests itself, is its impact on the choice of profession and on the level of functioning at work. Up to date research indicates that an important role in professional functioning is played by interaction between temperament-dependent strength of nervous system activation, and the stimulation value of work activities.¹⁵ Temperament has also been shown to be one of the variables affecting job satisfaction.¹⁶ Moreover, temperament has been associated with the level of stress load and the resulting risk of professional burnout as well as of other adverse effects of job-related stressors.^{17–21}

A growing number of studies indicate a possible relationship between temperament and choice of profession. A large part of this research concerns temperamental traits associated with the selection of specialties by medical students. It has been shown that students with qualities conducive to inquisitiveness choose internal medicine, “leadership” qualities favor the choice of surgery, people willing to save others choose emergency medicine, “dependent” subjects choose pediatrics, while the “compassionate” choose psychiatry.^{22,23} A number of studies also indicate the relationship between affective temperament and the choice of profession. Akiskal et al²⁴ conducted a study comparing outpatients from various professional groups and the control group of outpatients without being assigned to any professional group. They showed that in comparison with the control group, doctors and lawyers show a higher level of depressive temperament, managers and entrepreneurs – demonstrate higher level of hyperthymic-temperament, while artists and architects – of cyclothymic temperament. The only study to directly compare different affective temperaments of different professional groups was the study of Figueira et al²⁵ with the participation of students. Students of artistic and law faculties exhibited cyclothymic or irritable temperament, students of construction were found to be

hyperthymic, whereas nursing and psychology students demonstrated depressive and anxious temperaments.

The aim of the present study was to compare affective temperament of subjects performing professions differing with regard to the amount of stress exposure, creativity involved, and the necessity to enter relationships with clients or patients. It fills the research gap by directly comparing temperamental traits in different professional groups, with the enrolment of subjects actively performing these professions. To our knowledge, no up to date study was performed using above settings.

Materials and Methods

Temperament Evaluation

Affective temperament was assessed by means of the Temperament Assessment of Pisa, Paris and San Diego Autoquestionnaire (TEMPS-A). The TEMPS-A is a 110-item yes-or-no self-report autoquestionnaire, designed to assess affective temperament in psychiatric and healthy subjects. It consists of five sub-scales: depressive, cyclothymic, irritable, hyperthymic and anxious.²⁶ We used the Polish version of TEMPS-A, validated in the sample of 521 Polish undergraduate students.²⁷ In the sample from the present study, TEMPS-A showed satisfactory reliability, with Cronbach-alpha coefficients of 0.69 for depressive, 0.79 for cyclothymic, 0.73 for hyperthymic, 0.79 for irritable, and 0.86 for anxious temperament.

Subjects

The study group consisted of 759 subjects - 90 firefighters aged 22–45 (32.33±5.62, mean ± SD), 198 professional artists aged 19–71 (42.03 ± 13.33), 80 athletes aged 18–33 (24.25 ± 3.94), 197 bank employees aged 22–55 (35.46 ± 6.50), 100 nurses aged 23–62 years (41.34 ± 7.39), and 77 paramedics aged 21–56 (30.88 ± 9.88). The gender distribution in each of the groups is presented in Table 1. The artists recruited for this study are musicians - instrumentalists working in the philharmonic orchestra and singing

in the opera choir. The group of athletes included rowing professionals, runners and volleyball players. Bank employees were workers on different bank positions. The nurses included in the study worked in palliative medicine and geriatrics departments. The group of paramedics included doctors and paramedics employed in emergency medicine departments. Participation in the study was entirely voluntary, the study participants were not dependent on any of the members of the research team. Written information about the possibility of taking part in the study was hung in the workplace, and the subjects contacted the researchers on their behalf. All subjects gave written consent to participate in the study after study procedures were fully explained to them. The study was approved by Nicolaus Copernicus University in Torun, Collegium Medicum Bioethics Committee. It was conducted in accordance with the Declaration of Helsinki.

Statistical Analysis

Statistical analyses were performed with Statistica 13.1 program (StatSoft). One-way analysis of variance (ANOVA) was performed for the assessment of between-group differences. Post-hoc comparisons were performed with Tukey's test.

Results

TEMPS-A results in the whole studied group are presented in Table 2 and in Figure 1. There were significant between-sex differences in several temperaments. Females showed higher rates of depressive, cyclothymic and anxious temperaments, whereas males scored higher on hyperthymic temperament scale.

One-way ANOVA was used to assess between-group differences in affective temperaments. Post-hoc comparisons were performed using the Bonferroni test. There were significant differences between all studied groups with regard to all temperaments, the results were displayed in Graph 1 and Table 3.

Table 1 Sociodemographic Variables in Six Professions

| | Firemen | Musicians | Athletes | Bank Managers | Nurses | Paramedics | Statistic |
|-------------|------------|-------------|------------|---------------|------------|------------|--------------------------|
| Age | 32.33±5.62 | 42.03±13.33 | 24.25±3.94 | 35.46±6.50 | 41.34±7.39 | 30.88±9.88 | ANOVA: p<0.001 |
| Sex (%male) | 90 | 45 | 45 | 49 | 36 | 58 | χ ² : p<0.001 |

Note: Values are given as mean±std. deviation.

Table 2 Affective Temperaments, as Measured by TEMPS-A in the Whole Studied Group

| | Whole Group (n=759) | Male (n=403) | Female (n=356) | Student's t |
|-------------|---------------------|--------------|----------------|------------------|
| Depressive | 0.29±0.13 | 0.28±0.13 | 0.30±0.13 | t=-2.58; p=0.02 |
| Cyclothymic | 0.28±0.18 | 0.26±0.18 | 0.30±0.19 | t=-3.10; p=0.002 |
| Hyperthymic | 0.55±0.20 | 0.57±0.20 | 0.52±0.19 | t=3.19; p<0.001 |
| Irritable | 0.18±0.17 | 0.18±0.19 | 0.18±0.15 | t=0.13; p=0.89 |
| Anxious | 0.23±0.18 | 0.20±0.17 | 0.27±0.18 | t=-5.09; p<0.001 |

Note: Values are given as mean±std. deviation.

Depressive Temperament

For depressive temperament $F(5; 763) = 17,173$; $p < 0.0001$, artists obtained significantly higher results compared to the groups of firemen ($p < 0.001$), athletes ($p < 0.001$), bankers ($p < 0.001$), nurses ($p < 0.0001$) and paramedics ($p < 0.001$). Athletes also obtained lower scores than bankers ($p < 0.01$) and nurses ($p = 0.01$).

Cyclothymic Temperament

With regard to cyclothymic temperament ($F(5; 763) = 10.42$; $p < 0.001$), firefighters achieved lower results compared to artists ($p < 0.001$), athletes ($p < 0.01$), bankers ($p < 0.001$), nurses ($p < 0.001$) and paramedics ($p = 0.04$).

Hyperthymic Temperament

For hyperthymic temperament, ($F(5; 752) = 22.56$; $p < 0.001$), athletes scored higher than firefighters ($p < 0.001$), artists ($p < 0.001$) and nurses ($p < 0.001$), bankers obtained higher scores compared to firefighters ($p < 0.001$), artists ($p < 0.001$) and nurses ($p < 0.001$). Similarly, paramedics achieved higher results compared to firefighters ($p = 0.01$), artists ($p < 0.001$) and nurses ($p < 0.001$).

Irritable Temperament

With regard to irritable temperament $F(5, 753) = 4.34$; $p < 0.001$, bankers obtained lower results compared to artists ($p = 0.01$), athletes ($p = 0.05$), and nurses ($p = 0.01$).

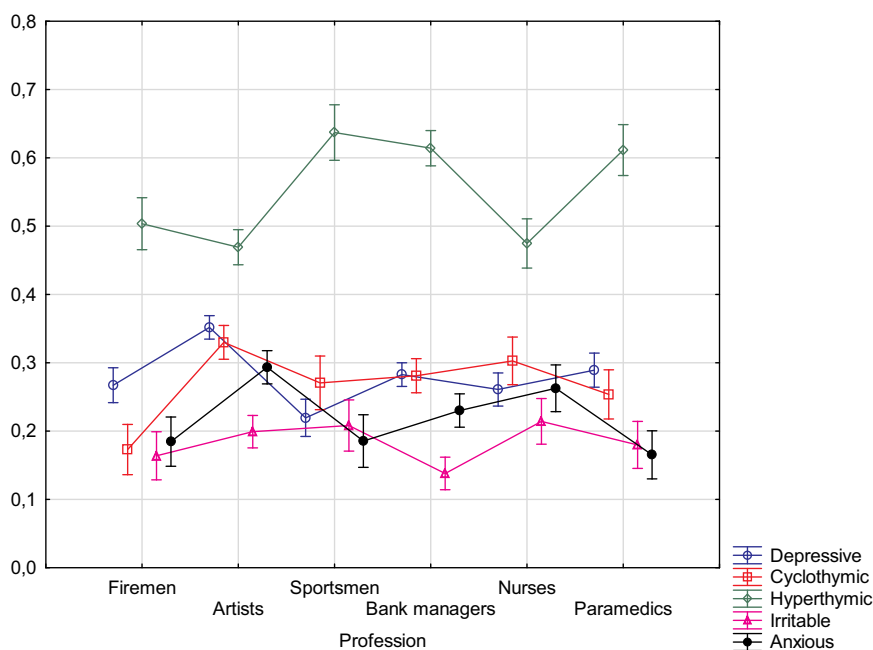


Figure 1 Affective temperaments (means, std. deviations), as measured by TEMPS-A in six professions.

Table 3 Affective Temperaments, as Measured by TEMPS-A in Six Professions

| | Firemen | Musicians | Athletes | Bank Managers | Nurses | Paramedics | ANOVA |
|--------------------|-----------|-----------|-----------|---------------|-----------|------------|--------------------------|
| Depressive | 0.26±0.12 | 0.35±0.14 | 0.21±0.10 | 0.28±0.09 | 0.26±0.12 | 0.28±0.13 | F(5;763)=17.173; p<0.001 |
| Cyclothymic | 0.17±0.16 | 0.32±0.20 | 0.27±0.17 | 0.28±0.12 | 0.30±0.22 | 0.25±0.16 | F(5;763)=10.42; p<0.001 |
| Hyperthymic | 0.50±0.20 | 0.46±0.19 | 0.63±0.17 | 0.61±0.15 | 0.47±0.21 | 0.61±0.17 | F(5;763)=22.56; p<0.001 |
| Irritable | 0.16±0.21 | 0.19±0.17 | 0.20±0.17 | 0.13±0.09 | 0.21±0.23 | 0.17±0.16 | F(5;763)=4.34; p<0.001 |
| Anxious | 0.18±0.19 | 0.29±0.20 | 0.18±0.17 | 0.22±0.09 | 0.26±0.23 | 0.16±0.13 | F(5;763)=10.873; p<0.001 |

Note: Values are given as mean±std. deviation.

Anxious Temperament

In terms of anxious temperament, artists obtained higher results compared to firefighters ($p<0.001$), athletes ($p<0.001$), bankers ($p<0.001$) and paramedics ($p<0.001$). Moreover, nurses scored higher than firefighters ($p=0.05$), athletes ($p=0.05$) and paramedics ($p=0.01$).

Discussion

The present study showed significant differences between professional groups - firefighters, artists, athletes, bankers, nurses and paramedics, in terms of affective temperament. The observed between-group differences are in favour of the concept of functional and socially positive value of affective temperaments, in this case, in the choice of profession. A possible interpretation of these results is presented below in the context of the importance of individual temperaments for performing particular professions.

Assessment of affective temperaments in the whole studied group revealed significant between-sex differences. Females showed higher rates of depressive, cyclothymic and anxious temperaments, and males showed higher rates of hyperthymic temperament. These results are concordant with reports from other studies in healthy populations.²⁸

The artists exhibited higher, compared to other groups, intensity of depressive and anxious temperaments. This result was predictable in light of up to date studies indicating higher risk of developing mood and anxiety disorders in artists.^{29,30} From a positive perspective, more intense experiencing of emotions such as sadness or anxiety can have a positive impact on the performance of creative tasks.¹⁰ Furthermore, the high ability to engage emotionally in the performance is a prerequisite for the successful performance of artistic professions, and is also positively evaluated by the audience.³¹ Surprisingly, the artists did not differ from the other studied groups in the level of

cyclothymic temperament, which in previous studies was associated with creativity. This result can hardly be explained by the high overall level of cyclothymia in all groups enrolled, as the artists from the present study exhibited a lower level of cyclothymic temperament, compared to other studies.^{32,33} The possible explanation for this result is that the group of artists in the present study consisted of chamber musicians and choir singers. In other studies, in which the affective temperament of the artists was assessed, representatives of other creative disciplines – writers, actors, and painters were also enrolled. It is possible that they display a different profile of temperament, which may result from differences between subspecialties within particular professional groups – a hypothesis that warrants further investigation. Another explanation is that choir and chamber musicians perform in group, where prosocial features associated with anxious and depressive temperaments are more appropriate than mood variations associated with cyclothymic temperament.

Another interesting observation is that athletes, bankers and paramedics showed a higher intensity of hyperthymic temperament compared to firefighters, artists and nurses. The obvious explanation for these differences is the fact that the professions of an athlete, bank manager and paramedic are associated with high stimulation and the need for efficient operation under stress. In addition, the need to deal with competition within one's professional group is a feature characteristic of the work of athletes and managers. Furthermore, paramedics need to make quick decisions affecting one's health and life. Considering the above-mentioned features, hyperthymic traits such as resistance to stress, leadership, and high energy levels may increase interest in taking up one of these professions, positively affect the level of its performance, as well as the chances of remaining in it.^{34,35} Hyperthymic temperament is

related to the interest in high risk and extreme activities which reflects the demand for stimulation, satisfied by the discussed professions.³⁶ It was also shown to positively influence the performance in emotionally challenging situations often encountered by athletes, managers and paramedics.³⁷ Interestingly, the firefighters did not belong to the “hyperthymic” group in the present study. This is something we did not predict, as similarly to the paramedics, their work is to bring help in life-threatening situations. The explanation may be the fact that firefighters are a highly hierarchized professional group in which work often consists of following the orders of leaders. In this case, hyperthymic traits are not as favorable as in paramedics, more often having to make decisions on their own. On the other hand, conducive to the work of firemen is the ability to maintain emotional balance, which was reflected in the fact that they exhibited the lowest intensity of cyclothymic temperament, among all the groups studied.

The final result worth noticing are the differences in temperament between medical professions. Nurses turned out to be more anxious and less hyperthymic than paramedics. This confirms the research previously carried out in both professional groups, where a high level of hyperthymic temperament was observed in paramedics, while anxious temperament - in nurses.^{19,38} The present study is the first to directly compare the temperament of these professional groups. Higher level of hyperthymic temperament in paramedics is beneficial due to the fact that, more often than nurses, they work in life-threatening situations, and have to perform efficiently under pressure. Nurses, on the other hand, can benefit from the altruistic features of anxious temperament, as their contact with the patient is longer, more profound, they also experience more situations in which an empathy-based relationship should be established.

The results of the present study are of importance for the occupational management as well as for the clinical practice. It contributes to the growing body of evidence for the relationship between affective temperament and professional predispositions, thus supporting the legitimacy of assessing affective temperament in the recruitment process. It may help in assessing the compatibility between the workplace demands and the characteristics of the employee it will also enable the assessment of the risk of adverse effects of job-related stressors in a given group of employees, and the selection of appropriate preventive actions.

The practical implications of the results of this and related studies also apply to the work of physicians, in particular psychiatrists. In light of these results, information about the profession performed by the patient may support the prognosis of the course of patient’s mood disorder, response to pharmacotherapy, and the potential risk of mood disorders in patients seeking treatment for other conditions.

One limitation of the present study is that the groups were not matched in terms of gender, which may have contributed to some of the between-group differences observed. Up to date research in various populations has consistently shown that men, compared to women, show a higher intensity of hyperthymic temperament, and lower intensity of cyclothymic and anxious temperaments. In the present study, these disparities relate to groups of firefighters, nurses and paramedics. The fact that the firefighters were a group entirely made up of men could thus contribute to the low level of cyclothymic temperament in this group. Considering this, it should however be noted that the imbalance between men and women in some of the groups from the present study reflect the general disparities of men and women working in these professions. The impact of the gender distribution on temperament scores in groups from the present study is not entirely obvious, as it has been shown that within occupational groups traditionally related to one of the genders, gender differences in temperament are much smaller than in the general population.³⁹ Different gender distribution in the groups of paramedics and nurses could also have caused the paramedics group to show a higher intensity of hyperthymic temperament whereas nurses – of anxious temperament. Even in this case, however, the effect of the occupational group on temperamental differences should not be completely overruled. This is indicated by the results of the study by Jaracz et al¹⁹ in which nurses showed a higher intensity of anxiety temperament compared to the sex-matched civil servants group.

Conclusion

The results obtained support the concept of adaptive and socially useful role of affective temperaments. The studied professional groups show different individual temperamental profile, which is justified in such aspects of the profession, as the level of stimulation, stress encountered, the necessity of making important decisions, or entering into relationship with the patient.

Disclosure

The authors report no conflicts of interest in this work.

References

- Allport GW. *Personality: A Psychological Interpretation*. New York: Holt; 1937.
- Buss AH, Plomin R. *Temperament: Early Developing Personality Traits*. New Jersey: Erlbaum; 1984.
- Thomas A, Chess S. *Temperament and Development*. New York: Brunner/Mazel; 1977.
- Rende RD. Longitudinal relations between temperament traits and behavioral syndromes in middle childhood. *J Am Acad Child Adolesc Psychiatry*. 1993;32(2):287–290. doi:10.1097/00004583-199303000-00008
- Akiskal HS, Mendlowicz MV, Jean-Louis G, et al. TEMPS-A: validation of a short version of a self-rated instrument designed to measure variations in temperament. *J Affect Disord*. 2005;85(1–2):45–52. doi:10.1016/j.jad.2003.10.012
- Akiskal HS, Akiskal KK. In search of Aristotle: temperament, human nature, melancholia, creativity and eminence. *J Affect Disord*. 2007;100(1–3):1–6. doi:10.1016/j.jad.2007.04.013
- Akiskal HS. Dysthymia and cyclothymia in psychiatric practice a century after Kraepelin. *J Affect Disord*. 2001;62(1–2):17–31. doi:10.1016/s0165-0327(00)00347-5
- Solmi M, Zaninotto L, Toffanin T, et al. A comparative meta-analysis of TEMPS scores across mood disorder patients, their first-degree relatives, healthy controls, and other psychiatric disorders. *J Affect Disord*. 2016;196:32–46. doi:10.1016/j.jad.2016.02.013
- Fico G, Caivano V, Zinno F, et al. Affective temperaments and clinical course of bipolar disorder: an exploratory study of differences among patients with and without a history of violent suicide attempts. *Medicina (Kaunas)*. 2019;55(7). doi:10.3390/medicina55070390
- Srivastava S, Childers ME, Baek JH, et al. Toward interaction of affective and cognitive contributors to creativity in bipolar disorders: a controlled study. *J Affect Disord*. 2010;125(1–3):27–34. doi:10.1016/j.jad.2009.12.018
- Sakai Y, Akiyama T, Miyake Y, et al. Temperament and job stress in Japanese company employees. *J Affect Disord*. 2005;85(1–2):101–112. doi:10.1016/j.jad.2004.03.012
- Moore DJ, Atkinson JH, Akiskal H, Gonzalez R, Wolfson T, Grant I; HNRC Group. Temperament and risky behaviors: a pathway to HIV? *J Affect Disord*. 2005;85(1–2):191–200. doi:10.1016/S0165-0327(03)00193-9
- Tondo L, Vázquez GH, Sani G, Pinna M, Baldessarini RJ. Association of suicidal risk with ratings of affective temperaments. *J Affect Disord*. 2018;229:322–327. doi:10.1016/j.jad.2017.12.061
- Akiskal HS. Toward a definition of generalized anxiety disorder as an anxious temperament type. *Acta Psychiatr Scand*. 1998;98(s393):66–73. doi:10.1111/j.1600-0447.1998.tb05969.x
- Strelau J. *Różnice Indywidualne. Historia, Determinanty, Zastosowania*. Warszawa: Scholar; 2014.
- Watson D, Slack AK. General factors of affective temperament and their relation to job satisfaction over time. *Organ Behav Hum Decis Process*. 1993;54(2):181–202. doi:10.1006/obhd.1993.1009
- Tei-Tominaga M, Akiyama T, Miyake Y, Sakai Y. The relationship between temperament, job stress and overcommitment: a cross-sectional study using the TEMPS-A and a scale of ERI. *Ind Health*. 2009;47(5):509–517. doi:10.2486/indhealth.47.509
- Oniszczenko W. Temperamental correlates of trauma symptoms in firemen, policemen and soldiers. *Int J Occup Med Environ Health*. 2014;27(4):599–607. doi:10.2478/s13382-014-0287-3
- Jaracz M, Rosiak I, Bertrand-Bucińska A, Jaskulski M, Nieżurawska J, Borkowska A. Affective temperament, job stress and professional burnout in nurses and civil servants. *PLoS One*. 2017;12(6):e0176698. doi:10.1371/journal.pone.0176698
- Koski TPK, Hintsanen M, Miettunen J, et al. Temperament and early intentions to retire: a northern Finland birth cohort 1966 study. *J Occup Environ Med*. 2019;61(2):136–143. doi:10.1097/JOM.0000000000001501
- Oniszczenko W, Ledzińska M. Sex, affective temperaments and information stress. *Int J Occup Med Environ Health*. 2019;16(5):635–644. doi:10.13075/ijomh.1896.01392
- Sievert M, Zwir I, Cloninger KM, Lester N, Rozsa S, Cloninger CR. The influence of temperament and character profiles on specialty choice and well-being in medical residents. *PeerJ*. 2016;6:e2319. doi:10.7717/peerj.2319
- Leung J, Cloninger CR, Hong BA, Cloninger KM, Eley DS. Temperament and character profiles of medical students associated with tolerance of ambiguity and perfectionism. *PeerJ*. 2019;7:e7109. doi:10.7717/peerj.7109
- Akiskal KK, Savino M, Akiskal HS. Temperament profiles in physicians, lawyers, managers, industrialists, architects, journalists, and artists: a study in psychiatric outpatients. *J Affect Disord*. 2005;85(1–2):201–206. doi:10.1016/j.jad.2004.08.003
- Figueira ML, Caeiro L, Ferro A, et al. Temperament in Portuguese university students as measured by TEMPS-A: implications for professional choice. *J Affect Disord*. 2010;123(1–3):30–35. doi:10.1016/j.jad.2009.10.005
- Akiskal HS, Akiskal KK, Haykal RF, Manning S, Connor P. TEMPS-A: progress towards validation of a self-rated clinical version of the temperament evaluation of the memphis, Pisa, Paris, and San Diego Autoquestionnaire. *J Affect Disord*. 2005;85(1–2):3–16. doi:10.1016/j.jad.2004.12.001
- Borkowska A, Rybakowski JK, Drozd W, et al. Polish validation of the TEMPS-A: the profile of affective temperaments in a college student population. *J Affect Disord*. 2010;123(1–3):36–41. doi:10.1016/j.jad.2009.09.024
- Vázquez GH, Tondo L, Mazarini L, Gonda X. 2012 affective temperaments in general population: a review and combined analysis from national studies. *J Affect Disord*. 2012;139(1):18–22. doi:10.1016/j.jad.2011.06.032
- Andreasen NC. The relationship between creativity and mood disorders. *Dialogues Clin Neurosci*. 2008;10(2):251–255.
- Kyaga S, Landén M, Boman M, Hultman CM, Långström N, Lichtenstein P. Mental illness, suicide and creativity: 40-year prospective total population study. *J Psychiatr Res*. 2013;47(1):83–90. doi:10.1016/j.jpsychires.2012.09.010
- Murray G, Johnson SL. The clinical significance of creativity in bipolar disorder. *Clin Psychol Rev*. 2010;30(6):721–732. doi:10.1016/j.cpr.2010.05.006
- Vellante M, Zucca G, Preti A, et al. Creativity and affective temperaments in non-clinical professional artists: an empirical psychometric investigation. *J Affect Disord*. 2011;135(1–3):28–36. doi:10.1016/j.jad.2011.06.062
- Jaracz M, Borkowska A. Creativity and affective temperament in artistic and non-artistic students: different temperaments are related to different aspects of creativity. *J Creat Behav*. 2020;54(4):975–984. doi:10.1002/jocb.426
- Rovai L, Maremmanni AG, Leonardi A, et al. TEMPS-A[P] temperament profile related to professional choice. Differences between applicants to become a cadet officer in the Italian Air Force or Navy. *J Affect Disord*. 2013;15(1):106–110. doi:10.1016/j.jad.2012.07.021
- Jaracz M, Paciork P, Buziński A, Borkowska A. Affective temperament and executive functions in emergency medicine professionals. *J Affect Disord*. 2014;168:192–196. doi:10.1016/j.jad.2014.07.004

36. Maremmani I, Dell'Osso L, Rovai L, et al. Discriminant and convergent validity of TEMPS-A[P] correlation with MMPI and the emotional-affective state following a stressful situation. *J Affect Disord.* 2011;129(1-3):27-33. doi:10.1016/j.jad.2010.06.035
37. Siwek M, Dudek D, Drozdowicz K, et al. Temperamental dimensions of the TEMPS-A in male and female subjects engaging in extreme or/and high risk sports. *J Affect Disord.* 2015;170:66-70. doi:10.1016/j.jad.2014.08.036
38. Kikuchi Y, Nakaya M, Ikeda M, Takeda M, Nishi M. Job stress and temperaments in female nurses. *Occup Med (Lond).* 2013;63(2):123-128. doi:10.1093/ocmed/kqs212
39. Maremmani I, Dell'Osso L, Rovai L, et al. Temperamental traits of women applying for a type of job that has been characterized historically by male identity: the military career as case study. *J Affect Disord.* 2011;130(1-2):275-279. doi:10.1016/j.jad.2010.10.006

Psychology Research and Behavior Management

Dovepress

Publish your work in this journal

Psychology Research and Behavior Management is an international, peer-reviewed, open access journal focusing on the science of psychology and its application in behavior management to develop improved outcomes in the clinical, educational, sports and business arenas. Specific topics covered in the journal include: Neuroscience, memory and decision making; Behavior modification and management; Clinical

applications; Business and sports performance management; Social and developmental studies; Animal studies. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/psychology-research-and-behavior-management-journal>